OCCUPATIONAL ILLNESSES AND INJURIES DUE TO EXCESS EXPOSURE TO PESTICIDES CONTAINING METHYL BROMIDE REPORTED BY PHYSICIANS IN CALIFORNIA IN 1981

by

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SUMMARY

During 1981, California physicians reported 28 cases of occupational illnesses and injuries resulting from exposure to fumigants containing methyl bromide. Twelve of the 28 cases were systemic illnesses, 4 were eye injuries, and 12 were skin injuries. The total number of occupational illnesses and injuries increased from 23 cases in 1980 to 28 cases in 1981; this is less than the number of cases that occurred in each of the years 1976 to 1979 which ranged from 35 to 47 cases per year. The number of systemic illnesses, however, was lower in 1981 than in any of the previous 5 years. There was 1 extremely serious case this year; the worker was hospitalized for 120 days and is permanently disabled. Overall, with the one exception, the severity of the illnesses and injuries was not great. The total number of days of disability for the other 27 workers was 66 days as compared to 109 days in 1980. Three of these workers accounted for 62% (41 of 66 days) of the days lost. The days of hospitalization for the 27 workers was 2 days compared to 20 days in 1980. The circumstances leading to the overexposures can be attributed primarily to inadequate employee training or supervision, carelessness, or equipment failure. Of the 28 workers, only three required hospitalization, an additional 10 lost time from work as a result of their incident.

Products involved in overexposures in 1981 were: Methyl Bromide 99.5, Dow Methyl Bromide, Namco Methyl Bromide, Namco Namfume, Dowfume MC-2, Terr-O-Gas 75, Meth-O-Gas, Brom-O-Gas, Tri-Brom, Tri-Con 67/33, and Dawson 73 Fumigant.

INTRODUCTION

Methyl bromide is a widely used fumigant. It is used as a structural, commodity, soil, and nursery stock fumigant. It controls weeds, nematodes, insects, soil-borne diseases, termites, and rodents. Methyl bromide is extremely hazardous by vapor inhalation. It is one of the more dangerous pesticides in common use because of its toxicity and physical characteristics. When handling and applying methyl bromide, extreme caution should be exercised to guard against overexposure. Methyl bromide vaporizes at 40°F at atmospheric pressure to a colorless and odorless gas which is detectable only by appropriate instruments. Workers may breathe air containing injurious or lethal concentrations of methyl bromide without their knowledge. The liquid formulation as well as the gas can cause eye and skin burns. Contact of the skin with liquid methyl bromide or high concentrations of the gas may cause an itching and prickling of the skin, followed by reddening and later formation of the vesicles and blisters which heal slowly. Severe burning of the cornea may result from contact of the liquid with the eyes. The onset of symptoms of acute poisoning may be delayed for 4-6 hours or more. This poses a potentially dangerous situation. For this reason, hospitalization for observation of cases in which significant exposure has occurred is often advisable.

The 28 occupational exposures to methyl bromide which were reported by physicians as occurring in 1981 in California and the on-site follow-up investigation data assembled by county agricultural commissioner's investigators were evaluated and summarized.

In addition to the initial on-site investigation, there was a follow-up telephone survey in February and March 1982 of persons exposed to methyl bromide during 1981 and classified as systemic illnesses. The questions asked each person in the telephone survey were designed to update and supplement the information appearing in either the Doctor's First Report of Work Injury or the follow-up investigations conducted by the local county agricultural commissioner's staff. The questions were: (1) In your opinion, what caused your illness? (2) How long were you in the hospital? (3) How long were you off work? (4) After the incident, how long was it before you felt completely normal? (5) During your recuperation, what symptoms did you experience? (6) How long did you received a physician's follow-up care? (7) Do you have any residual symptoms? If so, what are they? (8) How could this incident have been prevented? Six of the 12 exposed persons (systemically ill) were contacted in the follow-up investigation conducted 4 to 14 months after exposure; the remainder could not be located by telephone. The results are summarized in the following case studies.

Systemic Illnesses - 12 Cases

Two employees were fumigating chiles that were in nonairtight cardboard cartons and airtight cardboard drums in a warehouse with Dow Methyl Bromide. The procedures the employees followed included punching a hole in the containers with the sharp end of the applicator probe, pumping gas

into the containers for a count of 3, removing the probe, and sealing the hole with tape. One worker vomited at least 4 times before he was taken to a medical clinic. Upon arrival, he collapsed and was immediately taken to a hospital and admitted. A follow-up telephone conversation with the County Department of Agriculture 14 months later revealed the employee was in a coma for 9 days, in the hospital for 120 days, and he is permanently disabled. The second employee experienced some poisoning symptoms, was treated, and had fully recovered. Enforcement actions have been filed against the employer for certain alleged violations of laws and regulations. Due to the legal ramnifications of the case, the employer and employees were not contacted in the follow-up telephone investigation. The investigation by the county indicate the company did not have a restricted materials permit (they were refused a permit the previous year), had purchased the material illegally (no permit; from an out-of-state firm); no supervision was provided for the workers; the workers were not trained in the proper use of methyl bromide; and the workers were not wearing any protective gear (i.e., gas masks). The county investigators stated that the fumigation area in the warehouse was not well ventilated.

An employee responsible for repairing seavans entered one which contained a residual amount of methyl bromide. Within a half an hour, he complained of having a sore throat, blurred vision, nausea, and of being confused. He was admitted to the hospital for 1 day for observation. He missed 2 days of work. The county's investigation, a month later, revealed few details of the incident because the worker had been fired and could not be located.

After fumigating some tarped containers with Namco Namfume, an employee removed the application hose and was hit in the face with a residual amount of gas left in the hose. The hose had been put through a hole in the tarp about 5 feet off the ground. Thirteen hours later he went to a physician complaining of headaches, vomiting, diarrhea, weakness, and confusion. The physician treated him with oxygen and a sedative after diagnosing the case as acute bromide inhalation and toxicity. He missed 15 days of work. An attempt was made to contact the employee by telephone to conduct a second follow-up investigation; however, he could not be located.

A commodity fumigation worker was involved in several fumigations of almonds in warehouses and 1 fumigation in a van over a 2-week period. He wore the proper safety equipment each time. During the van fumigation, he spilled methyl bromide onto his hands, shoes, and the side of his body while removing a can of Dow Methyl Bromide from the applicator. He immediately washed his hands, but drove 1 mile to his home before taking a shower and changing his clothes. He continued to perform fumigation work for 3 more days before complaining of being tired, dizzy, short of breath, and having common cold symptoms. He was taken to a physician who advised the worker to avoid any exposure to methyl bromide until the symptoms disappeared. Five days later, a fiery-red rash appeared on his feet which quickly spread to other parts of his body. He returned to the physician who ordered him to stay off work until further notice, while treating him with oral medication and a dermally applied cream. He was also ordered not to wear any footwear. The follow-up telephone survey was conducted 6 months later. During the conversation, the employee said all of the symptoms except the rash

disappeared within 1 week. Further, the rash prohibited him from wearing his shoes for 2 weeks without aggravating the condition. He remained under the physician's care (once or twice a week) for 4 weeks more. His feet had completely healed by the end of that time. He lost 12 days of work. Due to the nature of the incident, the rash was probably caused by a prolonged exposure of the feet to work shoes contaminated with methyl bromide.

A tractor driver doing a preplant-fumigation of a grape vineyard with Methyl Bromide 99.5 was exposed to the gas when the hose from the cylinder ruptured. He was taken to a hospital where he arrived complaining of nausea, weakness, dizziness, and shortness of breath. He was admitted to the hospital for less than 1 day for observation. He lost 3 days of work. The follow-up telephone survey was conducted 11 months later. The day after the incident he said he was still feeling nauseous and dizzy, but felt good by the second day. He had no residual symptoms and required no follow-up medical care.

An assistant sanitarian was using Dawson 73 Fumigant to fumigate machinery. Twice during the operation, once when he felt a gap open between the gas mask and his face and once when he took his gas mask off on the roof of the building, he smelled a faint odor of the fumigant. The following day he smelled the fumigant again while checking a tailings bucket for insect counts. He experienced lightheadedness and stomach cramps. He was taken to a physician, whose diagnosis was acute methyl bromide poisoning. He was given medication for the stomach cramps. He missed 2 days of work. The follow-up telephone survey was conducted 5 months later, but no new information came to light. The employee confused the details of this case with a nonpesticide-related incident that occurred about the same time.

An employee of a fruit packing plant found a cannister of Meth-O-Gas leaking. He promptly shut off the cannister's valve which stopped the leak. Later, he complained of nausea, lightheadedness, chest discomfort, and jitteriness and was taken to a hospital. The follow-up telephone survey was conducted 12 months later. The employee stated that he was in the hospital for 8 hours for observation. He received follow-up medical care for the 2 days he was off work. He continued to have a slight headache and nausea that lasted about a week to a week and a half, and then no more obvious residual symptoms.

A nursery worker was potting plants in damp potting soil which had been fumigated with methyl bromide the week before. After 1 hour of exposure she complained of dizziness, nausea, a burning throat, burning eyes, and pressure in the forehead. The follow-up telephone survey was conducted 12 months later. The employee said she felt like she was on a cheap drunk, but had completely recovered within an hour. She had no residual symptoms and did not miss any days of work. The employees were not allowed to work with the soil until it was dry and aired out.

A forklift driver for a fruit packing plant inhaled some fumes (SO_2 and methyl bromide) while working in a stack of figs. He complained of weakness and visual problems and was taken to a physician. The physician's diagnosis was toxic chemical inhalation and was treated with oxygen for 5 minutes. The follow-up telephone survey was conducted 4 months later. The employee said he had had headaches and an upset stomach for about 10 days after the

incident. He was under a physician's care the first 3 days after the incident, but missed no days of work.

An employee experienced flu-like symptoms while assisting in a soil fumigation using Dowfume MC-2. His employer took him to a physician as a precautionary measure. The physician's diagnosis was Pneumonitis aggravated by exposure to a pesticide. He did not lose any days from work. The county's investigation, conducted a month and a half later, determined that the employee had moved to Mexico and had not returned.

An employee was fumigating almonds when a rubber hose attached to the methyl bromide cylinder ruptured, exposing him. Four days later he went to a physician, whose diagnosis was chemical pleuritis with conjunctivitis. The physician treated the employee and anticipated he would be under medical care for 2 to 4 days. No days of work were lost. An attempt was made to contact the employee by telephone to conduct a second follow-up investigation, however, he could not be reached.

Eye Injuries - 4 Cases

An employee was fumigating prune tree holes with Methyl Bromide 99.5 when the glass measuring cylinder cracked under pressure and sprayed methyl bromide onto his face and upper body. He immediately removed his shirt and another employee washed him down with water. He was taken to the hospital within 10 minutes. He was admitted to the hospital for 24 hours for observation with the only symptom being noted was reddening of the eyes. He was released with no further symptoms. He missed 2 days of work. He returned to Mexico before the county investigated the incident. This case was initially classified as a systemic illness, but information received at a later date indicated it to be an eye injury only.

A structural fumigator was in the process of removing the bonnet on a cylinder of Methyl Bromide 99.5 when he accidentally opened the valve of the cylinder. The brass cap, which normally covers the valve opening when the cylinder is not in use, was not in place thereby allowing the gas to escape. The escaping gas sprayed into the employee's face. He went to see a physician, whose diagnosis was mild chemical conjunctivitis. The employee missed no days from work.

An employee was cleaning the filtering system of a methyl bromide injector when the connecting hose broke. A residual amount of methyl bromide in the hose splashed into his eyes. He immediately flushed his eyes with plenty of clean water and was taken to a physician where he was examined and treated. He missed no days from work, but was scheduled for follow-up treatment 1 week later.

An employee walked into a pesticide storage area and found 3 one and a half pound cannisters of methyl bromide leaking. Later he complained that his eyes were burning and was taken to a physician. The physician's diagnosis was conjunctivitis. He was treated and released to return to work. No further treatment was required. The cannisters were removed by a chemical company.

Skin Injuries - 12 Cases

An employee accidentally sprayed his right foot with Dow Methyl Bromide while fumigating rodent burrows with a hand-held application device. He went to a physician the following day after his right foot and toes blistered. The physician diagnosed the injury as a chemical burn and rendered standard burn treatment. The employee was off work for 14 days with follow-up treatment given during this time. No further problems occurred after cessation of the medical treatment. A cease and desist order was issued to the employer because the use of the product was inconsistent with the current registration.

At waist level, an employee was opening 1-pound cannisters of Dowfume MC-12 to be used for soil fumigation when he spilled some of the material on himself. By the next morning, both of his feet and 1 hand were red and swollen. He went to a physician whose diagnosis was erythema. Treatment was provided. The employee missed 6 days of work, but completely recovered. The employer changed the application procedures after the incident to prevent further injuries.

A structural fumigation worker noticed a leak in the delivery tube of a cannister of Methyl Bromide 99.5 and stepped on it. He then called for his partner to turn off the gas. He received burns to both feet from the incident. He went to a physician who cleansed the affected areas before applying an ointment. He was to receive daily burn care for several days after the incident. The employee lost 5 days of work with his feet being completely healed within a week of the incident. The employee could have prevented his injury by turning off the gas first. The crack in the hose was a result of old age. A regular inspection program of all hoses would alert the operator when hoses need to be replaced and would decrease the chance of injury to employees.

A field fumigation worker was checking the hoses hooked up to the shanks of the tractor when 1 came loose. He promptly reconnected the hose into place. The next morning he awoke with a rash and blisters on his buttocks and went to a physician. He missed 3 days of work.

An employee was fumigating preplant almond tree holes with Namco Namfume. He was wearing old and worn rubber boots which he dragged through the fumigated soil. He also dripped some of the methyl bromide on his boots. He received burns to both of his feet. He went to a physician that afternoon. The physician diagnosed the injury as a chemical burn and prescribed cold, wet compresses and ointment for 3 days. He was laid off from work after the incident.

A field fumigator was changing methyl bromide tanks when some of the material dripped out of the line and onto 1 of his boots. He removed his boot and sock a few minutes later when he noticed a warm sensation in his foot. He washed the affected area with a boric acid solution. A rash and scaly skin developed on the foot about 4 days later, but he

did not seek medical attention for another 3 days. The physician diagnosed the injury as primary irritant dermatitis and prescribed cold water soaks and ointment for 5 days. He missed no days from work.

A ranch foreman was fumigating preplant walnut tree holes with methyl bromide. When he pulled the probe out of the ground, some of the material came back up and sprayed him in the face. He went to a physician whose diagnosis was minor facial burns. No treatment was given. He missed no days from work.

A structural fumigator contaminated his shoes with methyl bromide while removing the delivery hose after fumigating a building. His feet and ankles became swollen and blistered. The next day he went to a physician whose diagnosis was contact dermatitis. Cold wet soaks and ointment were prescribed. He did not miss any days of work.

An employee was fumigating preplant almond tree holes with 1-pound cans of Brom-O-Gas. While tightening the adapter that punctures the cans, some of the material leaked onto his gloves. A rash and a burn developed on his hands. He was taken to a physician whose diagnosis was chemical dermatitis. He was treated with a topical ointment. He missed no days of work.

An employee had a rash develop on his wrist and feet after removing the shanks from a tractor that had used Brom-O-Gas (methyl bromide) for a soil fumigation. He was wearing coveralls and rubber gloves while working with the equipment. The physician's diagnosis was allergic dermatitis. It was not stated whether treatment was given. No days of work were missed.

An employee of a structural fumigator had a rash develop on his hands, arms, and neck an hour after he removed the tarps from a fumigated house. The physician's diagnosis was a contact allergy and prescribed treatment for it. No days of work were lost.

An applicator fumigating soil with Terr-O-Gas 75 was changing the filter on the application system. He said he did not bleed the lines properly and some residual methyl bromide shot out into his face. A burn developed on the affected area. He was taken to the emergency room of a hospital where he was observed for a few hours. He did not miss any days of work from the incident.

Discussion

There was a slight increase in the total number of occupational illnesses and injuries; from 23 cases in 1980 to 28 cases in 1981. The increase occurred in the number of eye and skin injuries, not in the systemic illnesses. However, the most severe cases continued to be systemic illnesses. One such case was of a worker who was hospitalized for 120 days and is permanently disabled. Excluding this worker, the number of days of disability and hospitalization decreased. Of these 27 workers, 3 accounted for 41 of the 66 days of work lost. Only 2 of the 27 workers were hospitalized, each for only 1 day. The follow-up telephone survey of the

systemic illnesses revealed that none of the 6 workers contacted had any residual symptoms present, although the worker previously mentioned (and not contacted) was known to be permanently disabled. Over 75% of the workers were exposed to methyl bromide while applying the material. The other workers were exposed while cleaning and/or repairing equipment or to residual amounts of the gas. The underlying causes of the illnesses and injuries were carelessness, lack of adequate training and supervision, and equipment failure. In many of these incidents, care was not taken to minimize exposure.

Tables are included to demonstrate the relationship assoicated with methyl bromide exposure and work activity, illness or injury type, disability incurred, and month and county of occurrence. The job categories reported at highest risk are field, commodity, and structural fumigators. These individuals may come in contact with concentrated methyl bromide. Systemic illnesses and skin injuries were reported at the same frequency, with eye injuries being much less frequent. The seriousness of the skin and eye injuries were not as severe as the systemic illnesses. Five of the 16 workers who suffered skin and eye injuries missed a total of 30 days of work. Only 1 of these workers was hospitalized and that was for 1 day. There were 12 workers who were systemically ill. One worker was hospitalized for 120 days and is permanently disabled. Six other workers missed a total of 36 work days, while 1 worker was hospitalized for 1 day. Methyl bromide is used year around; however, the majority of the illnesses and injuries are reported during the months of January to March, and August to November. Sixteen counties reported illnesses and/or injuries due to methyl bromide in 1981 reflecting the wide use of the material as a soil, commodity, and structural fumigant throughout the State. Data for the previous 5 years are included for comparative purposes. Overall, a gradual decline can be observed in the total number of reported illnesses and injuries associated with methyl bromide exposure as well as the severity of them. The number of incidents where the days of disability was unknown decreased over the years indicating the pesticide illness reporting system has improved.

Table 1

Occupational Illnesses and Injuries Due to Exposure to Methyl Bromide as Reported by Type of Illness and Amount Used From 1976 Through 1981[1/]

Type of Illness	1976	1977	1978	1979	1980	1981
Systemic Illness	27	27	22	23	14	12
Eye Injuries	7	6	5	7	1	4
Skin Injuries	13	4	8	12	8	12
Total	47	37	35	42	23	28
Amounts Used (lbs.)[2/]	4,182,217	6,552,667	5,538,020	8,371,274	6,064,630	6,256,714 [3/]

1/ 1976, 1977, 1978, 1979, and 1980 values included for comparative purposes.

2/ Usage reported according to the California Department of Food and Agriculture's Annual Pesticide Use Reports.

3/ The California Department of Food and Agriculture's 1981 Pesticide Use Report had not been published when this report was released. The figure used is a close approximation taken from the statewide total for each of the 12 months. This does not include corrections and late additions that will be included in the yearly report.

Table 2

Occupational Illnesses and Injuries Due to Exposure to Methyl Bromide as Reported by Job Category and Type of Illness in 1976 Through 1981[1/]

	1976	1977	1978	1979	1980	1981	Total
Systemic Illnesses	27	27	22	23	14	12	125
Job Category							
Applicator, Ground	0	0	0	0	0	1	1
Applicator, Other	1	0	0	0	0	0	1
Gardener/Maintenance, Public Buildings	1	0	0	0	0	0	1
Structural, Fumigation	1	1	2	2	0	0	6
Structural, Other	5	0	0	0	0	0	5
Nursery/Greenhouse, Drift or Residue	0	1	2	0	0	1	4
Nursery/Greenhouse, Applicator or Mixer/Loader	2	0	0	0	0	0	2
Fumigation, Field	2	1	3	4	1	1	12
Fumigation, Commodity	8	9	6	3	0	6	32
Cleaner/Repairer	0	0	0	0	2	0	2
PackerProcessor	0	0	1	0	0	0	1
Warehouse/Transportation Worker	1	3	0	0	3	0	7
Fireman	6	5	0	13	4	0	28
Policeman/Ambulance Driver	0	7	5	0	3	0	15
Manufacturing/Formulation Worker	0	0	0	1	0	0	1
Other Type Pesticide Exposure	0	0	3	0	1	3	7
Eye Injuries	7	6	5	7	1	4	30
Job Category							
Cleaner/Repairer	0	0	0	0	0	1	1
Gardener/Maintenance, Parks and Golf Courses	0	0	1	0	0	0	1
Structural, Fumigation	0	0	1	2	0	1	4
Structural, Other	1	0	0	0	0	0	1
Nursery/Greenhouse, Applicator or Mixer/Loader	1	1	0	0	0	0	2
Fumigation, Field	1	3	2	4	0	1	11
Fumigation, Commodity	3	2	1	1	0	0	7
Other Type Pesticide Exposure	1	0	0	0	1	1	3
Skin Injuries	13	4	8	12	8	12	57
Job Category							
Mixer/Loader (Ground Application)	1	0	0	0	0	0	1
Gardener/Maintenance, Parks and Golf Courses	1	0	0	0	0	0	1
Structural, Fumigation	2	0	0	1	1	3	7
Structural, Other	2	0	0	0	0	0	2
Nursery/Greenhouse, Applicator or Mixer/Loader	1	0	0	0	0	0	1
Fumigation, Field	3	1	6	4	5	8	27
Fumigation, Commodity	1	2	1	3	1	0	8
Field Worker	1	0	0	0	0	0	1
Cleaner/Repairer	0	0	0	0	1	1	2
Manufacturing/Formulation Worker	1	0	0	2	0	0	3
Other Type Pesticide Exposure	0	1	1	1	0	0	3
Self-Employed	0	0	0	1	0	0	1
Total Illnesses and Injuries	47	37	35	42	23	28	212

1/ 1976, 1977, 1978, 1979, and 1980 values included for comparative purposes.

Table 3

Occupational Illnesses and Injuries Due to Exposure to Methyl Bromide as Reported by Disability Status and Hospitalization in 1976 Through 1981[1/]

Estimated Days of Disability	Number of Workers 1976	1977	1978	1979	1980	1981
0 days	22	0	10	25	11	15
1-3 days	5	5	3	6	5	6
4-7 days	3	6	0	2	0	2
8-14 days	3	0	5	3	1	2
15-21 days	1	0	0	0	0	1
22-28 days	0	0	2	0	0	0
30 days	0	0	0	0	1	0
42 days	1	0	0	0	0	0
60 days	0	0	0	0	1[2/]	0
Permanent Disability	0	0	0	0	0	1
Unknown	12	26	15	6	4	1
	47	37	35	42	23	28
Estimated Days of Hospitalization						
0 days	41	28	30	41	21	24
1-3 days	4	8	1	0	0	2
4-7 days	1[3/]	1	1	0	1	0
8-14 days	0	0	0	1	1	0
120 days	0	0	0	0	0	1
Unknown	1	0	3	0	0	1
	47	37	35	42	23	28
Total days of disability	127	50	117	49	109	66[4/]
Total days of hospitalization	13	19	6	8	20	122[5/]

1/ 1976, 1977, 1978, 1979, and 1980 values included for comparative purposes.

2/ This individual was under a physician's follow-up care for 2 months during which period he was off work.

3/ Estimated by physician to be 7 days.

4/ This figure does not include the days of disability for the worker permanently disabled.

5/ One worker accounted for 120 of the 122 days of hospitalization.

Table 4

Occupational Illnesses and Injuries Due to Exposure to Methyl Bromide as Reported by Month of Occurrence in 1976 Through 1981[1/]

Month	1976	1977	1978	1979	1980	1981
January	1	5	2	14	1	3
February	8	3	1	3	2	3
March	3	6	7	1	0	3
April	3	3	2	6	1	0
May	2	1	2	3	1	1
June	3	0	1	0	0	2
July	5	1	6	1	1	1
August	3	4	1	6	1	4
September	7	2	2	2	12	4
October	4	2	7	2	2	3
November	7	4	3	3	0	2
December	1	6	0	1	2	2
Total	47	37	34[2/]	42	23	28

[1/] 1976, 1977, 1978, 1979, and 1980 values included for comparative purposes.

[2/] One unknown date of occurrence. Total cases for 1978 is 35.

Table 5

Occupational Illnesses and Injuries Due to Exposure to Methyl Bromide as Reported by County of Occurrence in 1976 Through 1981[1/]

County	1976	1977	1978	1979	1980	1981
Alameda	2	0	0	1	0	1
Butte	0	3	2	0	3	0
Colusa	0	0	1	1	0	1
Contra Costa	1	0	1	0	0	0
Fresno	3	1	3	0	1	2
Humbolt	0	0	0	1	0	0
Imperial	1	0	0	0	0	0
Kern	1	0	0	4	0	4
Kings	1	0	0	0	0	0
Los Angeles	6	11	8	4	1	5
Madera	0	0	2	0	0	0
Merced	2	0	1	1	1	1
Monterey	1	0	0	1	0	0
Orange	2	8	2	1	5	0
Riverside	3	2	1	1	0	1
Sacramento	2	0	2	1	0	0
San Bernardino	0	1	3	3	0	0
San Diego	2	6	0	0	2	3
San Joaquin	0	2	0	2	2	0
San Luis Obispo	0	0	0	0	0	1
Santa Barbara	8	0	2	0	0	2
Santa Clara	3	0	0	14	0	1
Solano	0	0	0	0	0	2
Sonoma	0	0	0	1	0	1
Stanislaus	3	1	2	2	1	1
Sutter	2	1	0	1	2	0
Tulare	1	1	0	0	0	0
Ventura	1	0	5	1	4	1
Yolo	2	0	0	1	0	1
Yuba	0	0	0	1	1	0
Total	47	37	35	42	23	28

[1/] 1976, 1977, 1978, 1979, and 1980 values included for comparative purposes.